MATHEMATICAL AND STATISTICAL ANALYSIS OF PEDAGOGICAL EXPERIMENTAL WORK OF PRESCHOOL CHILDREN OF MIDDLE AGE

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ABSTRACT

This article presents a mathematical and statistical analysis of the pedagogical experimental work of middle-aged preschoolers. According to the results of studies conducted by many scientists, children show that the dynamics of physical development and physical fitness of a schoolchild depends on the nature of consistently performed physical exercises. For the development of physical qualities of preschoolers, the most important issue is the correct organization and implementation of activities based on active games and exercises with elements of game sports. Based on them, we tried to highlight the results of physical fitness of middle-aged children before the experiment.

Keywords: Experiment-test, physical fitness, physical qualities, physical exercises, preschool education, kindergarten age, elements of sports.

INTRODUCTION

One of the most important signs of health in preschool educational organizations is the physical development of the child. Over the past 20 years, an increase in the number of functional disorders per child has been observed: at the age of 4, the vast majority of children have 1-3 deviations from various functional systems (cardiovascular, gastrointestinal, nervous, etc.); by the age of 6, their number increases to 4-5 in almost 50% of children.

One of the most important tasks of education is to use the necessary opportunities for physical development and strengthening health through physical education means and methods. Such opportunities may be the integration of various types of educational activities into the curriculum of kindergartens. For example, M.A. Pravdov combined physical education classes with mastering the alphabet in large groups of kindergartens, and some scientists (Menkova. Ivanovo region, Shuya, No. 92; S.V.) introduced the mastering of a foreign (English) language in physical education classes in primary school according to the program proposed by him. The results of these studies made it possible to: double the time for mastering the alphabet and performing physical exercises; combine cognitive and motor activity, which led to an increase in the effectiveness of solving educational and health problems [1].

Despite the undoubted advantages of combining various types of educational activities for children, solving this problem is hampered by the lack of specialists capable of teaching and ensuring physical development. It should be noted that special attention is paid to the physical education and health-improving environment in preschool educational organizations.

To ensure effective work on physical education in preschool educational organizations, specially equipped physical education halls and playgrounds are necessary. The standard designs of buildings commissioned for kindergartens and preschool children do not take into account many features of the rapidly growing body of a child that are very important for

comfortable life activities. In preschool age, speed and strength qualities, endurance, flexibility and agility increase significantly, many motor skills are formed, but the main ones (gyms and places for independent physical exercises) exercises) serve as a limiting factor that does not allow to fully ensure the development of the psychophysical and morphofunctional potential inherent in the child, which occurs naturally. In many kindergartens, the rooms available for music lessons and physical education only meet the needs of children up to 3 years old. In this regard, it is necessary to look for effective ways to solve this problem. Ideally, each kindergarten should be equipped with gyms equipped with appropriate equipment for the implementation of motor skills of children of middle preschool age. Undoubtedly, this problem is difficult to solve, only in nature there is a wide opportunity (expanding areas for physical exercises). The intensive path of development is currently considered the most acceptable for the budget sector of education. However, in the current economic conditions it is not suitable for all preschool educational institutions in the republic. Therefore The task of the administrative-economic and pedagogical teams of preschool educational institutions is to equip the sports hall area with inexpensive, non-standard, multifunctional equipment and inventory that meets hygienic, anatomical, physiological, intellectual, aesthetic, ergonomic and other requirements.

Experimental studies were conducted in selected state preschool educational institutions of Kashkadarya, Bukhara, Navoi regions, showing the effectiveness of the practice-based methodology for conducting classes using an artificial physical education and development environment. Unfortunately, we have witnessed the lack of training equipment and various sports equipment and equipment in such halls, both inside the kindergarten (group room) and on the territory of the preschool educational institution (veranda converted into a gym). This reduces the possibility of achieving the intended effectiveness. Plays a special role in physical education. The color scheme of the hall and the information environment are factors that determine the interaction of the external and internal environment, ensuring the life and development of the child.

Currently, there are significant difficulties in distributing the ever-increasing volume of educational materials recommended for various educational institutions in a strictly limited time interval [3].

One of the ways to solve this problem is the experience of scientific research and methodological work accumulated over more than 3 years on the basis of preschool educational organizations in the Bukhara region, which shows that integration as the main principle allows organizing a physical education and sports base in preschool educational institutions, ensuring the effectiveness of the entire complex of educational activities for children of all ages. Having studied scientific research and work experience, the “New Uzbek Child” physical education and health program has shown its effectiveness in practice. A distinctive feature of this program is the organization of a physical education, health, and developmental environment based on the activation of the child's sensorimotor activity. Physical activity is combined with cognitive activity in physical education. It is carried out on the basis of signs that come with the equipment in the hall and the buildings of the halls. For example, for a team relay race, lettered sticks and numerical signs are used to mark the floor, walls and ceiling, which serve as guidelines for construction and reconstruction. This allows you to form ideas in the open air outside the kindergarten.

It is also worth considering the interesting experience of organizing scientific research work on the basis of selected MTT sof the Bukhara region under our leadership. This organization

is solving the very important issue of assessing the calendar and biological age of children, substantiating the methods and forms of physical education work. The optimal form of organization is being justified and implemented for the organization of a city educational institution.

Our observations have shown that currently in Russia, in order to coordinate and consolidate efforts to develop the problem of physical education of children in preschool educational institutions, we have witnessed the work of the Laboratory "Study of Adaptive and Functional Capabilities of Children and Students" at the Faculty of Physical Education named after P.F. Lesgaft (Department of Biomechanics of the St. Petersburg State Academy of Physical Education), Adygea State University (Laboratory of Biomechanics of the ASU) and the Shuya State Pedagogical University. However, we believe that it is necessary to establish such research centers and laboratories.[ ]

This is due, firstly, to the fact that the contracting parties are located in different climatic and economic regions; secondly, to the fact that in solving scientific and methodological problems The need to combine material and intellectual resources and, finally, thirdly, the urgency of the tasks of strengthening the health of the younger generation in independent Uzbekistan.

METHOD

The level of knowledge of the students in the subject "Quantitative Methods" as a criterion for determining the physical activity of the students was assessed using the Blendlear technology using a 5-point method.

For this purpose, the final indicators of the first stage of the students of the experimental and control groups, in accordance with K. Pearson's χ^2 criterion, were compared with the indicators of the second, third and final stages.

In this case, the H_0 hypothesis is taken as the expected probability of the types of assessment during the observation period in the experimental and control groups as equal, and the alternative H_1 hypothesis is taken as unequal. That is, H_0 - after the experimental and control groups were tested, there was no significant change in the level of knowledge of the students. H_1 - significant changes were observed in the experimental and control groups.

To test this statistical hypothesis, first, the significance level α is determined to compare the empirical value with the critical value. In pedagogical research, the value of (α) is taken to be 0.05. In this case, the confidence interval 1-α is determined to be 1-0.05= 0.95, i.e., a 95% confidence level. The critical value of χ_i^2 when is given in Table 3.1.
Critical value of χ_i^2 when α=0.05

Initial and final results of middle school students who participated in experimental work
Table 3.1

M-1	1	2	3	4	5
χ_i^2	3,84	5,99	7,81	9,49	11,07

As noted above, the initial levels of mastery of the trainees were studied. The initial data on the trainees who participated in the experimental work are presented in the following table (see Table 3.1).

Initial and final results of middle school students who participated in experimental work
Table 3-1

Groups	Number of pupils	Grades							
		At the beginning of the experiment	At the end of the experiment	At the beginning of the experiment	At the end of the experiment	At the beginning of the experiment	At the end of the experiment	At the beginning of the experiment	At the end of the experiment
		"2"		"3"		"4"		"5"	
Bukhara region									
Experience	26	2	0	10	6	10	11	4	9
Control	25 25	3	2	9	9	10	11	3	3

Evaluation and analysis of the results of experimental work The effectiveness of experimental training in the formed groups was determined by the results of tests and assignments, and the results of the final analysis of the level of knowledge of the trainees were expressed as follows (see the table below). Based on this result, the results of the physical training of children educated in the 11th and 71st MTT in Bukhara were checked for empirical values and subjected to mathematical and statistical analysis.

The results of the tests conducted in the control and experimental groups formed from the trainees of the conducted research work were formed.

When calculating the empirical values for the experimental and control groups, the indicators of the experimental group were determined by M_i, the numbers of the corresponding trainees by m_i, and the same values for the control groups were determined by N_i, n_i, and the formula (3.2.1) was used.

$$\chi^2_{emp} = T \cdot N \cdot \sum_{i=1}^{M} \frac{(\frac{m_i}{T} - \frac{n_i}{N})}{m_i + n_i}$$

Arithmetic mean values and efficiency index in the experimental and control groups of experimental studies were calculated as follows
:

$$\overline{x} = \frac{1}{T} \cdot \sum_{i=1}^{M} M_i \cdot m_i, \quad \overline{y} = \frac{1}{N} \cdot \sum_{i=1}^{M} N_i \cdot n_i, \qquad \eta = \frac{\overline{x}}{\overline{y}}$$

Since M=4 in the experiment, the critical value χ_0.05^2=7.81 was obtained, which is equal to M-
1=3. The values for each preschool educational organization were calculated using this formula.

General results of the experimental work of middle group students of Bukhara region
Table 3.2

Region	Index	In experimental groups				In control groups			
		Number of trainees at the beginning of the experiment	%	Number of pupils at the end of the experiment	%	Number of trainees at the beginning of the experiment	%	Number of pupils at the end of the experiment	%
Bukhara region	Excellent	4	7	9	16	3	4	3	7
	Good	10	36	11	45	10	40	11	37
	Satisfactory	10	41	6	30	9	40	9	40
	Are you satisfied	2	16	0	9	3	16	2	16

The results of the trainees at the beginning of the experiment:

$$\chi^2_{emp} = 26 \cdot 25 \cdot \left[\frac{(\frac{2}{26}-\frac{3}{25})^2}{2+3} + \frac{(\frac{10}{26}-\frac{9}{25})^2}{10+9} + \frac{(\frac{10}{26}-\frac{10}{25})^2}{10+10} + \frac{(\frac{4}{26}-\frac{3}{25})^2}{4+3}\right] \approx 0{,}38;$$

$$\overline{x} = \frac{1}{26} \cdot [2 \cdot 2 + 3 \cdot 10 + 4 \cdot 10 + 5 \cdot 4] \approx 3{,}62;$$

$$\overline{y} = \frac{1}{25} \cdot [2 \cdot 3 + 3 \cdot 9 + 4 \cdot 10 + 5 \cdot 3] \approx 3{,}52;$$

$$\eta = \frac{3{,}62}{3{,}52} \approx 1{,}03.$$

The obtained empirical value is less than the critical value, i.e. 0.38<7.81. This indicates that the hypothesis H_0 can be accepted at the beginning of the experiment.

That is, in the experimental and control groups, there was no change in the physical training of the students before the experiment.

The results of the trainees at the end of the experiment:

$$\chi^2_{emp} = 26 \cdot 25 \cdot \left[\frac{(\frac{0}{26}-\frac{2}{25})^2}{0+2} + \frac{(\frac{6}{26}-\frac{9}{25})^2}{6+9} + \frac{(\frac{11}{26}-\frac{11}{25})^2}{11+11} + \frac{(\frac{9}{26}-\frac{3}{25})^2}{9+3}\right] \approx 5{,}58;$$

$$\overline{x} = \frac{1}{26} \cdot [2 \cdot 0 + 3 \cdot 6 + 4 \cdot 11 + 5 \cdot 9] \approx 4{,}12$$

$$\overline{y} = \frac{1}{25} \cdot [2 \cdot 2 + 3 \cdot 9 + 4 \cdot 11 + 5 \cdot 3] \approx 3{,}60;$$

$$\eta = \frac{4{,}12}{3{,}60} \approx 1{,}14.$$

The obtained empirical value is greater than the critical value, i.e. 5.58<7.81. Therefore, the proposed methodology is effective, which indicates that the hypothesis H_1 can be accepted. That is, after conducting the experimental work in the experimental and control groups, a change was noticed in the level of physical training of the students.

From the above results, it was found that the performance of the experimental group was 11% (1.14-1.03=0.11) higher than that of the control group.

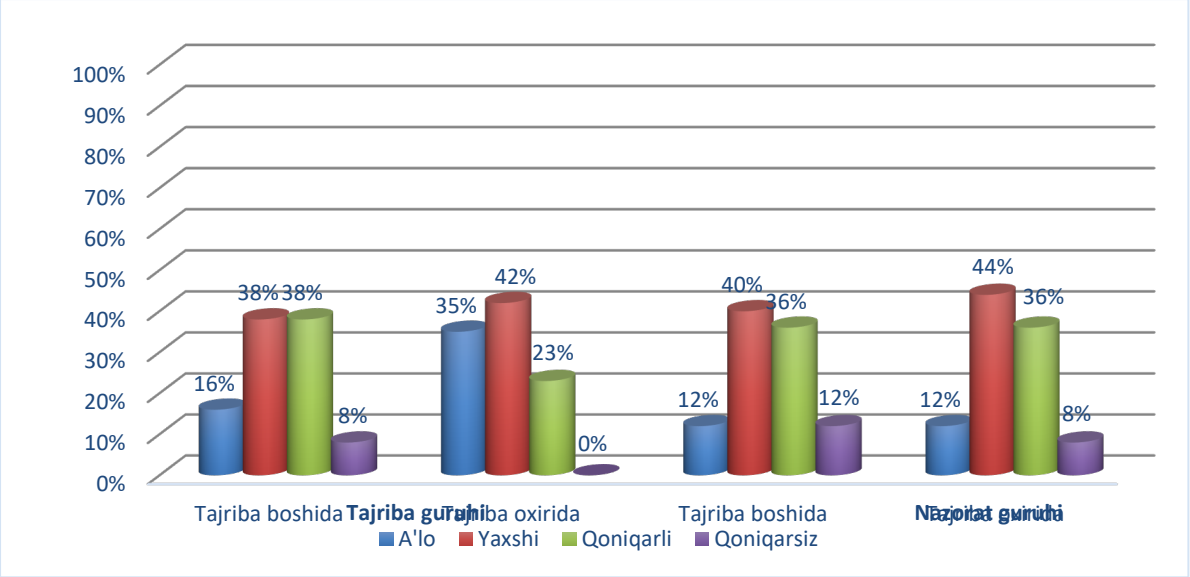

Figure 3.1. Diagram of learning indicators of the middle group of pupils who participated in the experimental work of the Bukhara region

Conclusion

It can be seen from the above that the correct selection of national outdoor games helped to make the activities based on them interesting, increased the level of physical development and preparedness of children. Also, the data obtained showed that planning and control were carried out correctly. At the same time, the health of boys and girls in the experimental group improved and the level of illness decreased. From this we can draw the following conclusion: more and more effective use of national games also affects children's health, and their widespread implementation greatly contributes to the development of physical culture.

The overall results of the experimental work of middle-class students of educational institutions in all regions (Bukhara, Kashkadarya and Navoi) showed that our experimental work can be effective.

The methodology recommended by us is effective, which indicates that the hypothesis H_1 can be accepted. That is, after the experimental work was carried out in the experimental and control groups, a significant change was observed in the physical training of students. The results showed that the indicators in the experimental group were higher than those in the control group.

The use of such methods and techniques allows children to deeply understand the essence of active and team games and physical exercises in physical education, and to learn with interest.

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